

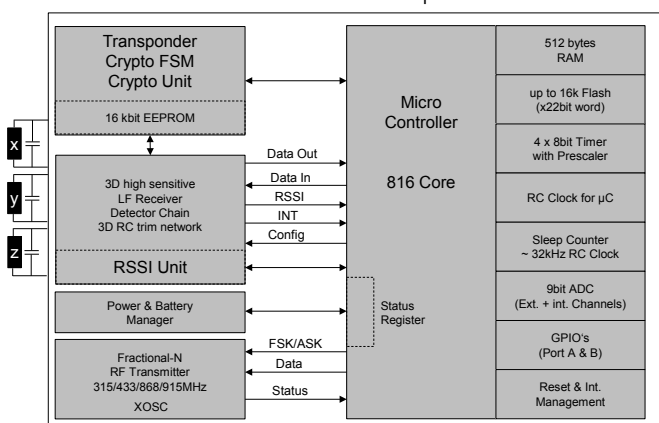
TAGMICRO-Tx3D

Ultra Low Power 8-bit Microcontroller, Fractional-N RF Transmitter & 3D LF Receiver

The TagMicro-Tx3D is designed for immobilizer and battery operated remote keyless entry (RKE) and/or passive keyless entry (PKE) / passive keyless start (PKS) applications. The transponder part is protocol and instruction-set compatible with the existing Smartrac products and works even without a battery.

The fully differential approach for the 3D LF Receiver supports very high Rx sensitivity and includes smart features such as Transponder antenna sharing and numerous configuration options enabling an optimal application balance between functionality and battery-lifetime. Together with the powerful, ETSI and FCC-compliant, highly configurable fractional-N based UHF-transmitter circuit the single chip solution establishes a bidirectional communication solution for all kinds of passive keyless applications.

Beside the broad flash memory size, the microcontroller offers brownout, power-check & glitch detection functions to ensure reliable operation at under voltage conditions. Each I/O is freely



programmable. A trimmed RC oscillator of up to 10MHz frequency allows stable operation without need for external clock generation. Featuring an 8-bit RISC architecture specially designed for very low power consumption, TagMicro-Tx3D executes up to 5 MIPS without compromising battery-lifetime.

Overview

Size / Package

Small package MLF32
5 × 5 mm

LF Frequency Band

125 kHz

UHF Frequency Bands

315/434/868/915 MHz

Operating Temperature

-40°C to +85°C

Tools & Service

- ▶ Easy to use DoC functions, full peripheral integration, C-Compiler
- ▶ Windows-based software programs with engineering support

Applications

- ▶ Car immobilizers
- ▶ Remote keyless entry (RKE)
- ▶ Passive keyless entry (PKE)
- ▶ Keyless Start/Go (PKE/PKG)

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Key Features – Microcontroller

Wide supply voltage range 1.8 V – 3.6 V	
True low current	▶ 0.7mA typ. active mode @ 10MHz ▶ 200 nA typ. power-down mode
Memory size	▶ 16k/12k/8k/6k x 22 bit Flash ▶ 16k Bit EEPROM ▶ 512 bytes RAM
Up to 5 MIPS @ 10MHz	
“Run by field” capability	
8-level Supply Voltage Level Detection (SVLD)	
40 Bit Sleep Counter (>1year), Watchdog	
2 ports of configurable I/Os (up to 8xIRQ, pull-up/down, open drain)	
Timer Capture / Output Compare / PWM	
4 high currents outputs (e.g. for LED driving)	
Dual Mode RC oscillator (1 MHz or 10 MHz)	
8-bit CoolRISC architecture	
16 registers	
200 ns instruction cycle time	
2 clocks per instruction	
POR, BO-Reset, OSC Fail detection	
8/16-bit Timer, Frequency generator	
9-bit, 1+5 channel A/D converter	
Analog and digital watchdog	

UHF Transmitter

Fractional N based architecture	
Programmable output power, 32 steps (~ -20dBm to ~ +13 dBm)	
Programmable output load capacitance	
Quartz XTAL fine-tuning feature	▶ temperature compensation ▶ improved oscillator stability
Single device concept for all frequencies (ASK & FSK modulation)	
Up to 100 kBps data rate (ASK Manchester)	
Manchester/Biphase/NRZ/Miller data encoder	

3D LF Receiver + RSSI

Differential Input + 3 independent x,y,z-signal chains (Analog and digital)	
Adjustable RX data rate (up to 8 kBaud)	
Adjustable Ultra high Rx listen mode sensitivity down to 350µVpp	
Gear level controlled RSSI measurement sensitivity down to 200µVpp	
Very low power consumption 4.8µA typ. for 3 axis @ listen mode @ default sensitivity, Polling System	
On-chip trimming capability for fres and Q (for each 3 axis)	
Shared antenna architecture (x-channel Rx & transponder)	
Supporting adjustable handover (sensitivity + timing)	
Circular receive buffer for Rx input data	
(inverted) Manchester & Miller data decoder support	
Configurable power and interrupt management	
Configurable receiver and wakeup robustness through chain concept and closed loop mechanism	
Debug function for RSSI and receiver	

Transponder & EEPROM

125 kHz Crypto Transponder functionality (battery-less)	
128bit AES Support	
Mileage Counter (increment only)	
3 different Secret Keys (96/128 bit each)	▶ Secret-Key 1 and 2 for Challenge/Response Mode, AES Mutual (ISO) Mode & Rolling Code Mode, Increment Counter
32 bit unique Device Identification number	
~ 14 kbit of free User Memory (UM)	
Lock-Bits to inhibit programming	
Marginal Read Check for EEPROM write operation	
LF Transmission rate 4 kBaud	
Parallel interface for EEPROM & crypto access via microcontroller	

Contact: Automotive

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